

WHAT IS CLAIMED IS:

1. A mixing tube comprising a first mixing passage and a second mixing passage, in each of which a plurality of elements having a sectional shape that changes continuously are connected in series, the mixing tube causing plural types of materials to be mixed to pass through the first mixing passage and the second mixing passage, repeatedly dividing and aggregating the materials to be mixed in a passing process,

wherein:

the first mixing passage and the second mixing passage are formed by a first outer frame member, a second outer frame member, and a partition member that is interposed between the first outer frame member and the second outer frame member, the three members dividing the mixing tube in a direction toward which the materials to be mixed pass; and

holes, each having a size that is half the size of each element are formed at fixed intervals in the partition member in a direction along which the materials to be mixed are mixed, the first mixing passage and the second mixing passage repeatedly dividing and aggregating due to the holes, thereby repeatedly dividing and aggregating the materials to be mixed.

2. A mixing tube according to claim 1, further comprising:

intermediate partitions provided in the first outer

frame member and the second outer frame member, the intermediate partitions dividing the first mixing passage and the second mixing passage;

wherein the intermediate partitions of the first outer frame member and the second outer frame member are welded in the holes of the partition member.

3. A mixing tube according to claim 1 or claim 2, further comprising:

intermediate partitions provided in the first outer frame member and the second outer frame member, the intermediate partitions dividing the first mixing passage and the second mixing passage;

wherein the intermediate partitions of the first outer frame member and the second outer frame member are each welded to the partition member.

4. A mixing tube according to claim 3, further comprising:

joining portions provided in the holes of the partition member, the joining portions contacting the intermediate partitions of the first outer frame member and the second outer frame member;

wherein the joining portions are welded to the intermediate partitions of the first outer frame member and the second outer frame member.

5. A mixing tube according to one of claims 1, 2, and 4, further comprising:

flanges provided in joining portions where the first outer frame member, the second outer frame member, and the partition member are joined, the flanges formed along, and outside of, the first mixing passage and the second mixing passage;

wherein the flanges of the partition member are sandwiched by the flanges of the first outer frame member and the second outer frame member, thus integrating the first outer frame member, the second outer frame member, and the partition member and forming the first mixing passage and the second mixing passage.

6. A mixing tube according to claim 3, further comprising:

flanges provided in joining portions where the first outer frame member, the second outer frame member, and the partition member are joined, the flanges formed along, and outside of, the first mixing passage and the second mixing passage;

wherein the flanges of the partition member are sandwiched by the flanges of the first outer frame member and the second outer frame member, thus integrating the first outer frame member, the second outer frame member, and the partition member and forming the first mixing passage and the second mixing passage.

7. A method of manufacturing the mixing tube of one of claims 5 and 6, the method comprising:

molding a first frame member and a second frame member that are made out of a thermoplastic resin;

forming holes in a partition member that is made out of a thermoplastic resin;

welding ends of flanges of the partition member, the first frame member, and the second frame member, the flanges of the first outer frame member and the second outer frame member sandwiching the flanges of the partition member, thus integrating the first outer frame member, the second outer frame member, and the partition member and forming a first mixing passage and a second mixing passage.

8. A method of manufacturing a mixing tube according to claim 7, wherein the first outer frame member and the second outer frame member are molded while forming intermediate partitions that divide the first mixing passage and the second mixing passage, and wherein the intermediate partitions and the partition member are welded, or the intermediate partition portions are welded.

9. A method of manufacturing the mixing tube of one of claims 5 and 6, the method comprising:

molding a first outer frame member and a second outer

frame member that are made out of a thermoplastic resin while forming intermediate partitions that divide a first mixing passage and a second mixing passage;

forming holes in partition members that are made out of a thermoplastic resin while forming joining portions that contact the intermediate partitions of the first outer frame member and the second outer frame member;

a first step of welding flanges of the first outer frame member and flanges of one of the partition members;

a second step of welding flanges of the second outer frame member and flanges of the other partition member; and

a third step of welding flanges of members manufactured during the first step and the second step.

10. A method of manufacturing the mixing tube of one of claims 5 and 6, the method comprising:

molding a first outer frame member and a second outer frame member that are made out of a thermoplastic resin while forming intermediate partitions that divide a first mixing passage and a second mixing passage;

forming holes in partition members that are made out of a thermoplastic resin while forming joining portions that contact the intermediate partitions of the first outer frame member and the second outer frame member;

a first step of welding flanges of the first outer frame member and flanges of one of the partition members, and welding the intermediate partitions of the first outer frame member and the joining portions of the one partition member;

a second step of welding flanges of the second outer frame member and flanges of the other partition member, and welding the intermediate partitions of the second outer frame member and the joining portion of the other partition member; and

a third step of welding flanges of members manufactured during the first step and the second step.